

Notice of Allowability

Application No.

10/783,269

Examiner

Hung T. Vy

Applicant(s)

UNGAR ET AL.

Art Unit

2163

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 10/09/2007.
2. ☒ The allowed claim(s) is/are 1-3,5-8 and 10-13.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 10/03/2007.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

Response to Arguments

1. In view of the arguments presented in the Appeal Brief filed November 09 2007, prosecution on the merits is reopened to address the issues raised in the Brief. Sign the notice of allowability by virtue of the Appeal Brief, claims 1-14 remain pending in this application. Claims 1-3, 5-8 and 10-13 are allowed

Examiner's Amendment

2. An examiner's amendment to the record appears below. Should the changes and /or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.3.12. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The following claim has been amended upon agreement by applicant during a telephone conversation with Mr. Ben Yorks on November 28, 2007.

The following is the new set of claims will be replaced for the original claims and amendment claims filed on 10/23/2007.

1. (Currently Amended) A semiconductor laser, comprising:
a substrate;
a first optical gain element that is fabricated on top of said substrate and generates a first light beam having a first optical frequency;
a second optical gain element that is fabricated on top of said substrate and generates a second light beam having a second optical frequency;

an optical frequency mixer that is coupled to said substrate and said first and second gain elements and mixes said first and second light beams to generate a polarization wave at a third optical frequency; and

a near-field phase grating that is adjacent to said first and second optical gain elements and phase modulates the polarization wave to couple a power from the polarization wave to an electromagnetic wave that propagates at the third optical frequency, the electromagnetic wave propagates in a direction essentially perpendicular to a propagation direction of the first and second light beams.

2. (Original) The laser of claim 1, wherein the third optical frequency is in the mid-infrared, long-infrared or Terahertz regions.

3. (Original) The laser of claim 1, wherein said optical frequency mixer includes a waveguide optically coupled to said first and second gain elements.

4. (Canceled).

5. (Original) The laser of claim 1, wherein the semiconductor laser is fabricated with group III-V material.

6. (Currently Amended) A semiconductor laser, comprising:

a substrate;

a first optical gain element that is fabricated on top of said substrate and generates a first light beam having a first frequency;

a second optical gain element that is fabricated on top of said substrate and generates a second light beam having a second frequency;

mixing means for mixing the first and second light beams to create a polarization wave at a third optical frequency and is coupled to said substrate, and;

phase modulation means for phase modulating the polarization wave for coupling a power of the polarization wave to an electromagnetic wave that propagates at the third optical frequency and is adjacent to said first and second optical gain elements, the electromagnetic wave propagates in a direction essentially perpendicular to a propagation direction of the first and second light beams.

7. (Original) The laser of claim 6, wherein the third optical frequency is in mid-infrared, long-infrared or Terahertz regions.

8. (Original) The laser of claim 6, wherein said mixing means includes a waveguide for mixing said first and second light beams.

9. (Canceled).

10. (Original) The laser of claim 6, wherein the semiconductor laser is fabricated with group III-V material.

11. (Currently Amended) A method for operating a semiconductor laser, comprising:

generating a first light beam having a first optical frequency from a first optical gain element fabricated on top of a substrate;

generating a second light beam having a second optical frequency from a second optical gain element fabricated on top of the substrate;

mixing the first and second light beams to create a polarization wave at a third optical frequency, and,

phase modulating the polarization wave with a phase grating that is adjacent to the first and second optical elements to couple a power of the polarization wave to an electromagnetic wave that propagates at the third optical frequency, the electromagnetic wave propagates in a direction essentially perpendicular to a propagation direction of the first and second light beams.

12. (Original) The method of claim 11, wherein the third optical frequency is in the mid-infrared, long-infrared or Terahertz regions.

13. (Currently Amended) The method of claim 11, wherein the first and second light beams are mixed in a waveguide coupled to the substrate.

14. (Canceled) .

Reasons for Allowance

3. Claims 1-3, 5-8, and 10-13 are allowed

The following is an examiner's statement of reason for allowance:

With respect to claim 1, none of the references of record teaches or suggests the claimed **a semiconductor laser, comprising, along with all the other claimed feature**, a substrate, a first optical gain element **that is fabricated on top of said substrate** and generates a first light beam having a first optical frequency, a second optical gain element **that is fabricated on top of said substrate** and generates a second light beam having a second optical frequency, optical frequency mixer that is coupled to said substrate and first and second gain elements and mixes said first and second light beams to generate a polarization wave at a third optical frequency, and **a near field phrase grating that is adjacent to said first and second optical gain elements**

and phase modulates the polarization wave to couple a power from the polarization wave to an electromagnetic wave that propagates at the third optical frequency, the electromagnetic wave propagates in a **direction essentially perpendicular to a propagation direction** of the first and second light beams.

Claims 3 and 5 are allowable by virtue of their dependencies on claim 1.

With respect to claim 6, the reason for allowance is the same with the claim 1.

Claims 7-8 and 10 are allowable by virtue of their dependencies on claim 6.

With respect to claim 11, none of the references of record teaches or suggests the claimed a method for operating a **semiconductor laser**, comprising, **along with all the other claimed feature**, generating a first light beam having a first optical frequency from a **first optical gain element fabricated on top of a substrate**, generating a second light beam having a second optical frequency from a **second optical gain element fabricated on top of the substrate**, mixing the first and second light beams to create a polarization wave at a third optical frequency, and, phase modulating the polarization wave with a **phase grating that is adjacent to the first and second optical elements** to couple a power of the polarization wave to an electromagnetic wave that propagates at the third optical frequency, **the electromagnetic wave propagates in a direction essentially perpendicular to a propagation direction of the first and second light beams**.

Claims 12-13 are allowable by virtue of their dependencies on claim 1.

Conclusion

4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".
5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung VY whose telephone number is (571) 272-1954. The examiner can normally be reached on Monday-Friday 8:30 am - 5:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DON WONG can be reached on (571) 272-1834. The fax numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 308-7722 for After Final communications.

Information regarding the status of an application may be obtained from the patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either private Pair or Public Pair. Status information for unpublished applications is available through Private Pair only. For more information about the PAIR system, see. Should you have question on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Hung T. Vy
Art Unit 2163
December 03, 2007.

Application/Control Number:
10/783,269
Art Unit: 2163

Page 8